
# DEVELOPING A WEB APPLICATION TO IMPROVE COMMUNICATION IN THE INDUSTRY

Project Proposal

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# 1. Introduction

Communication plays an important role in our daily lives. In the corporate world, businesses rely on effective communication to succeed. Effective communication is essential for a business since it enhances engagement between employees and strengthens relationships with clients (Zambas 2019). The overall efficiency in the work environment improves because of effective communication (EasyWorkNet 2019).

In the software development industry, communication remains a vital component of the core business. A typical process followed in the software development industry entails a client communicating requirements to a project manager and, the project manager communicating the requirements to the developers. When those requirements are poorly communicated, it can affect the quality of the end product, waste time, resources and that translates to money being lost (EasyWorkNet 2019). Thus, it is important for all the key stakeholders to have a good communication system.

The goal of this study is to develop a communication system that can be used to enhance communication between developers and management at a South African software development company. The system will be a web application that will allow project software developers to have access to important information with ease.

In the next section, the background of the research will be discussed.

**Keywords:** design science research, productivity, communication, agile software development.

# 2. Background to the study

At a South African software developing company where requirements are frequently being added or changed, the importance of communication increases. With the rapid growth of web-based applications project managers are constantly and easily communicating with clients (Dovleac 2015). How the project manager communicates to the project developers can still be difficult in smaller businesses where the project manager has more than one project. This can cause a project to lose valuable time, resources, and money.

A project manager can easily fall behind or forget about important information when it is not immediately communicated to the project developers. With information being available at a faster pace, the project developers can work on the requirements quicker, this will improve productivity and increase the project's success.

# 3. Problem statement

As programmers, we want to keep the most important tabs open but lack the number of screens needed to achieve this. We are not regularly on our phones to read messages, thus making it harder for important messages to reach the team or developer. When developers have to look at their phones periodically it lowers productivity and creativity (Schrader 2018).

This is common in smaller companies where the project manager is constantly busy with meetings for more than one project. Meetings are not always at the office and the scope or requirements of the project can quickly change.

For this reason, this study proposes to develop an artifact that will allow project managers and project developers to have access to a way of communicating and to access important information during the day. The research will be conducted using design science as it involves the creation of an artifact with means to improve an already existing state of practices as well as researching existing knowledge (Vijay Vaishnavi 2004).

## 3.2 Research questions to improve the design of the artifact are as follows:

1. How will design science help to develop the artifact?
2. What software will be needed to design the artifact?
3. What features need to be in the artifact?

# 4. Project description

The goal of this study is to create an artifact that will improve communication in a company by minimizing the number of programs that are open on a programmer's computer when working on a project. This study will explore solutions to improve communication and productivity in the industry by using an artifact that project teams can use to send or upload important information.

The key concept is to have one web application showed on one screen in the office that is shared between project managers and project developers where everyone can see important information with ease. While focusing specifically on applications that can make it easier for project managers and project developers to communicate.

# 5. Aims and objectives of project

This study proposes the development of a communication web application that can easily be viewed in an office by all employees to allow easy access to important communication regarding specific software development projects. The primary and secondary objectives for the study are provided next.

## 5.1 Primary objective

To develop a web application for a South African software development company that allows for easy access to important communication relating to specific projects.

## 5.2 Secondary objectives

### 5.2.1 Theoretical objectives

- Gain knowledge of design science research to guide the development of an artefact.
- To identify commonly used web applications in industry.
- To establish whether there is a need for communication web applications in the software development industry.

### 5.2.2 Empirical objectives

- To collect and analyse qualitative data in the form of interviews in order to understand what people in the software development industry need to make communication easier.
- To develop a communication web application that will provide easy access to desired software.

# 6. Procedures and methods that will be used

Data for this study will be collected through interviews by project managers and project developers that are already in the industry and will take place during the planning phase. This study will use qualitative content analysis. Qualitative content analysis has been defined as “a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns” (Hsieh and Shannon 2005). The process will begin during the early stages of data collection.

For this study, the most applicable research methodology is design science research. Research methodology based on information technology is an outcome of design science (Vijay Vaishnavi 2004). It focuses on the performance and development of artifacts, intending to improve an already functional artifact. Research in this discipline is seen as improving and understanding human performance (Kuechler 2012).

## 6.1 Process model for this research

Vijay Vaishnavi (2004) introduced a process model that included five steps when conducting a design science research project.

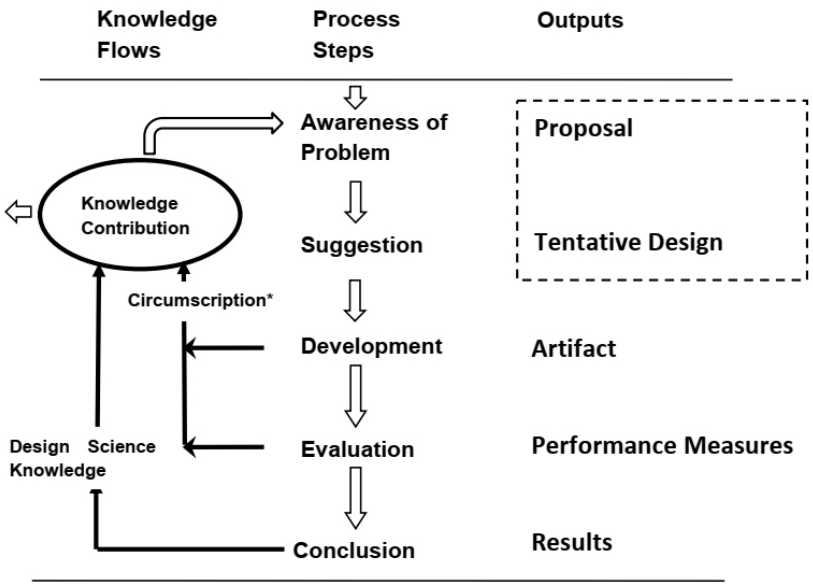


*Figure 1: Vaishnavi Process Model*

### 6.1.1 Awareness of problem

Multiple sources can be used for an awareness of a research problem. This includes identifying problems in a reference discipline or a new development in the industry. Part of this phase is becoming aware of the main problem and considering criteria for evaluating the artifact when it is done

### 6.1.2 Suggestion

This phase is where new functionality is envisioned. Non-repeatability has been criticized in this phase of the design science research method. A Tentative Design of a prototype forms part of the proposal if approved by the researcher. In all research methods, this creativity step has necessary analogs, as it creates curiosity to develop an artifact.

### 6.1.3 Development

If the Tentative Design is approved by the researcher further development and implementation take place in this phase. Implementation techniques will depend on the artifact that will be created. Formal proof may be needed to show the correctness of the design, for example constructing an algorithm.

### 6.1.4 Evaluation

By following the criteria set in the awareness of the problem phase, deviations of what was expected are noted and must be tentatively explained. The result in this phase can lead to a new design because the criteria are not met.

### 6.1.5 Conclusion

This phase is the end of the research cycle. The result of the research effort is typical, that of satisficing, where some deviations of the behavior of the artifact are revised.

# 7. Approach to project management and project plan

## 7.1 Agile methodology

According to Kumar and Bhatia (2012), this methodology gives an iterative, flexible design and building process. It includes a set of processes for comprehensive projects in environments that are constantly changing.

Agile was designed to overcome the old waterfall way of programming, which caused a project to fail after years because of something that happened in the early stages of the project. An overview of this methodology is creating smaller phases of the project called sprints. Where it looks to deploy a draft in the first sprint and a piece of software in the first couple of months. Feedback is needed from the customer on a daily basis, to ensure that the project is on track.

The most common and popular example of this methodology includes SCRUM, Feature Driven Development (FDD), Dynamic Systems Development Method (DSDM) and Crystal (Ismail 2019).

## 7.2 SCRUM

Only in the development phase of the project will be broken up into 2-week periods and at each start of the two weeks the project will undergo a sprint planning discussion where the backlog items will be prioritized, and some tasks will be placed back in the sprint backlog. According to Campbell (2020) this will make complex work transparent and easier to understand.

This methodology was chosen because the scope can easily change, and you have constant communication with the customer. This increases customer satisfaction, and some parts of the system can already be used as the project progresses (Campbell 2020).

At the end of each sprint, every task should be finished and ready to be released. Each task will also undergo a “show me”, “code review”, “merge” and a “QA”. This will reduce the risk of having bugs in the artifact because there is a user acceptance test layer.

# 8. Description of development platform, resources, and environments that will be used

The artifact for this study will be a web application. According to Paul Stanley Software (Stanley), there are several advantages to creating a web application. Users do not have to install an application because every computer has a browser. It is easy to update, and users have direct access to these updates.

For the user interface, Vue.JS will be used as a binding framework because It is easy to understand, small in terms of size, and flexible (Vivek 2018), as well as HTML, JavaScript, and CSS. For the backend Visual Studio's Web API will be used and written in C#. The Database management system that will be used is SQL SERVER. The database and website will be hosted on Azure.

Factors that play a role in the environment are as follows:

## 8.1 Rigour, validity, and reliability in quantitative research

In this study rigour is the quality of being extremely careful while working on the artifact. "Qualitative research is frequently criticised for lacking scientific rigour with poor justification of the methods adopted, lack of transparency in the analytical procedures and the findings being merely a collection of personal opinions subject to researcher bias" (Noble and Smith 2015). Demonstrating rigour will be challenging because when it comes to standards, there is no accepted consensus to be judged on.

Validity is the appropriateness of the processes, tools, and data. Validity can be tested when the choice of methodology is only appropriate when it can answer the research question, the desired outcome is valid according to the research question, the sampling of the data is appropriate, and conclusion and results are valid for the context and sample (Leung 2015).

Reliability in this study refers to the replication of the results and processes. Then diverse paradigms are used in qualitative research the definition of reliability is demanding and epistemology is counterintuitive. Thus consistency is the essence of reliability for qualitative research (Leung 2015).

## 8.2 Ethical considerations

According to Enago Acadamy (2020) ethical consideration includes:

### 8.2.1 Validity

Specific research questions have to address the research design. The result must correlate with the conclusion and to the questions posed.

### 8.2.2 Voluntary participation and consent

No individual should feel that they have to participate in the study. This includes any type of deception or persuasion.

### 8.2.3 Sampling

An explanation is a need for why you want a particular group of participants and why some groups have been left out.

### 8.2.4 Confidentiality

Confidentiality needs to be respected, if any participant is at risk of harm, they need to be protected.

### 8.2.5 Risk of harm

Everything in our power needs to be done to protect study participants. The risk to benefit ratio needs to be focused on.

### 8.2.6 Research Methods

Consideration of what is the right approach to the study.

## 9. Provisional chapter division

The study will include the following chapters:

### Chapter 1: Introduction

In this chapter the underlying problem will be introduced as well as the methodology and principles that is going to be used. The objectives will be stated, and development platforms will be noted.

### Chapter 2: Research methodology

In this chapter the research paradigm that is applicable to the study will be explained. It will also elaborate on the design science and why it was chosen for the study.

### Chapter 3: Literature review

Existing literature will be discussed in this chapter as well as key concepts of the study.

### Chapter 4: Data Analysis

In this chapter data gathering techniques will be discussed and how the data will be analysed to improve the existing concept.

### Chapter 5: The artefact design

This chapter will be used to display the web application artifact.

### Chapter 6: Conclusion

This chapter will conclude and give an overview of the study.

# 10. Summary

This project proposal serves as an introduction to the research of the paper. The problem for project managers that have more than one project, communicating important information for each project can be challenging. Where project developers that periodically look on their phones for messages can lower productivity and creativity.

The study will aim to develop a web application to improve communication in the industry. This web application should be flexible because every company uses different applications and if the expectations are not met then the application is of no use.

The objectives have been defined as well as what approach will be taken. The Vaishnavi process model will be followed to develop the application. Interviews will be used to gather data on what information should display on the web application. Rigour, validity, and reliability will be considered when working on the artifact as well as ethical considerations when gathering data.

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